

Summary of Libby Public School Sampling Results, Removal Actions, and 2008 Planning

Libby Superfund Site



November 2008

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Libby Superfund Site



November 2008

Libby Schools

Public Schools

Head Start

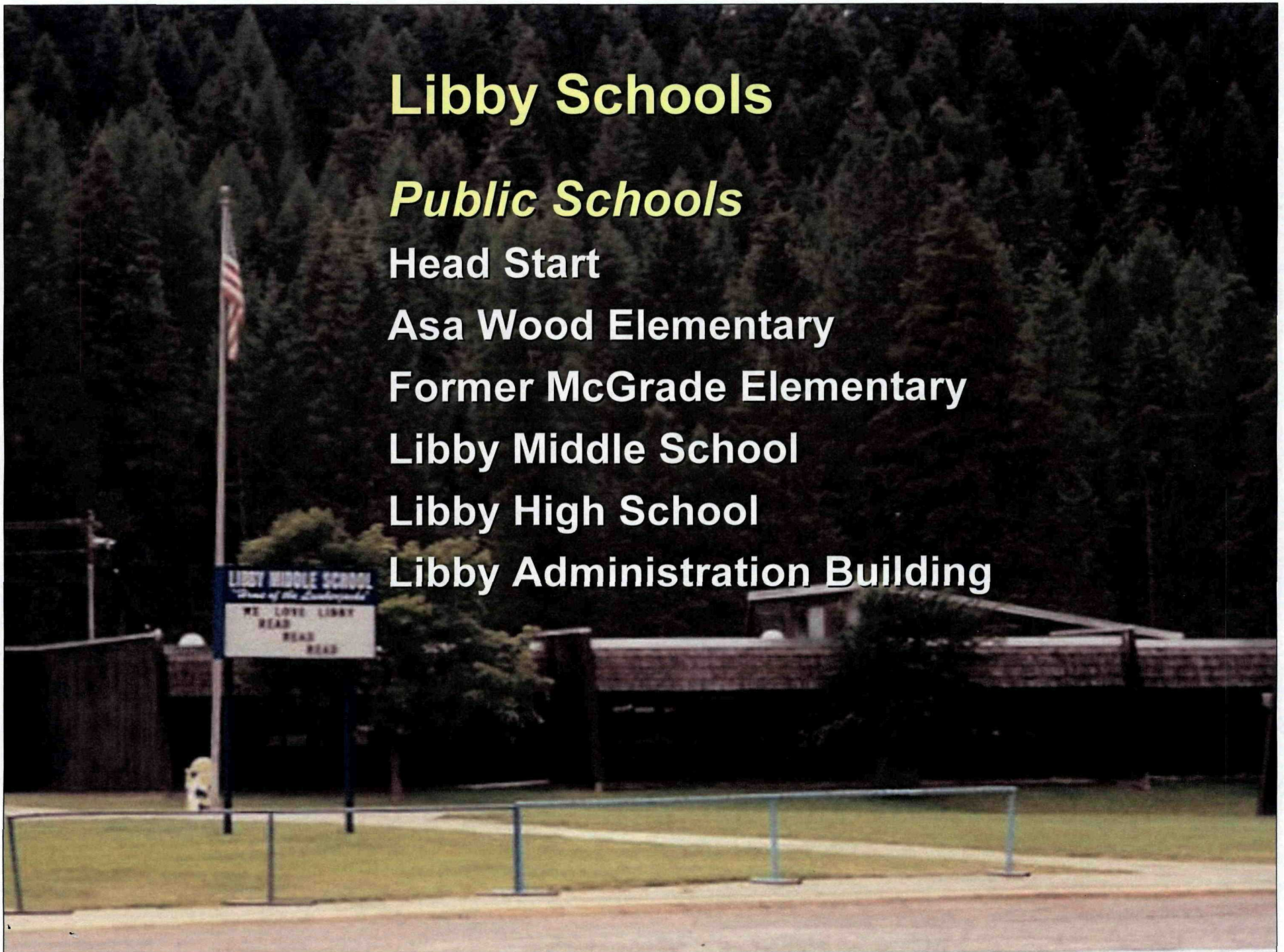
Asa Wood Elementary

Former McGrade Elementary

Libby Middle School

Libby High School

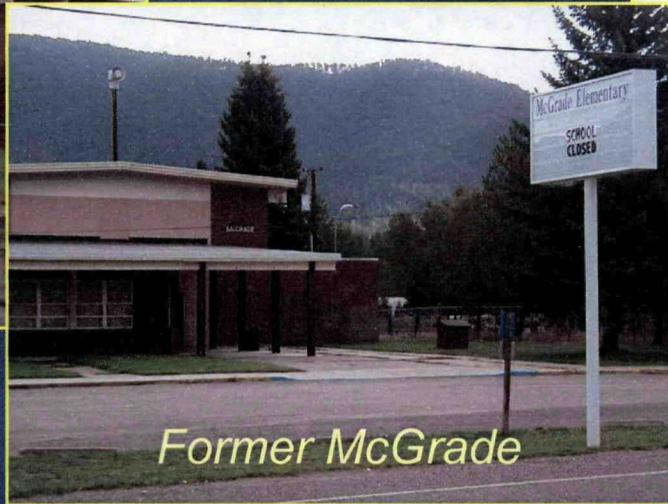
Libby Administration Building



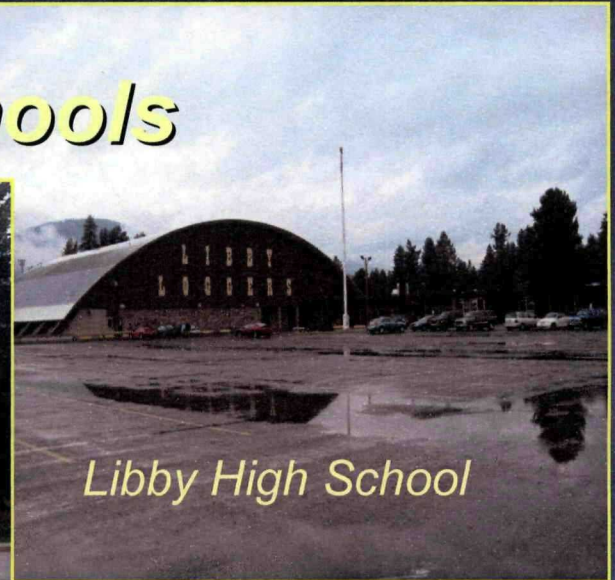
Libby Public Schools



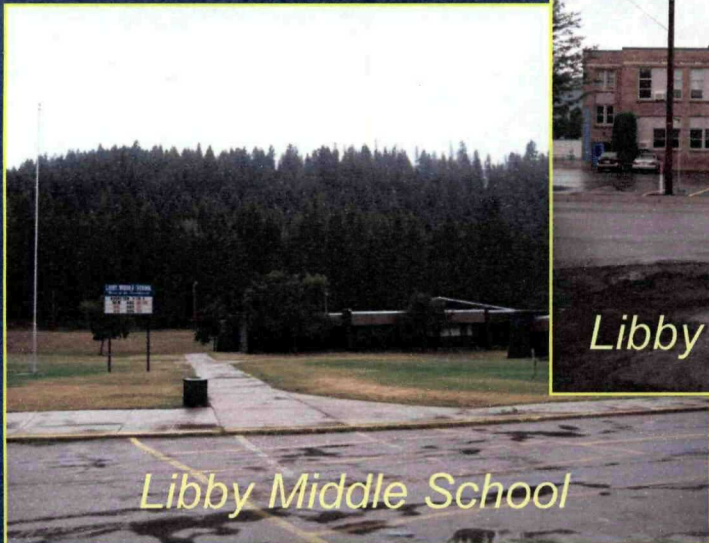
Head Start



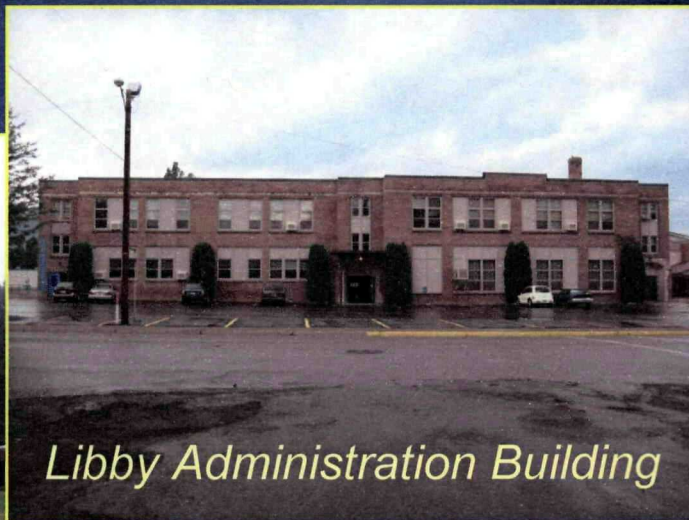
Former McGrade



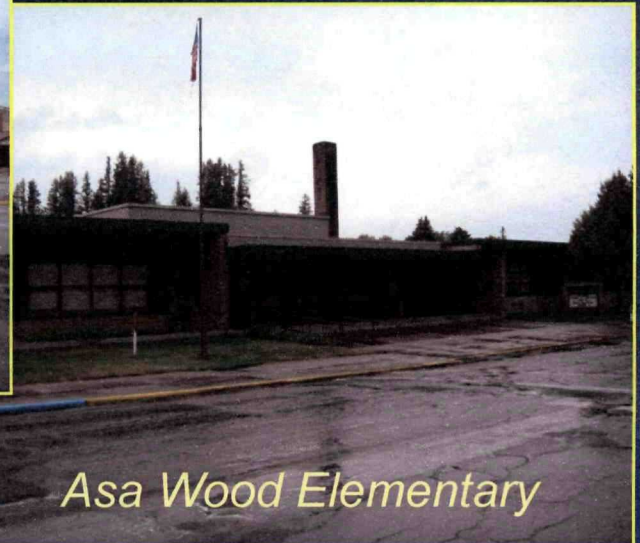
Libby High School



Libby Middle School



Libby Administration Building



Asa Wood Elementary

***Kootenai Valley Head Start
(formerly Plummer Elementary)***



Head Start (formerly Plummer Elementary) – Historical Investigation Results

Media	Date	# of Samples Collected	# and % of Samples with Detects				Analytical Method	Results and Sensitivity Range	
			LA	%	C	%		LA	C
Air	1/2000	4	0	0%	1	25%	TEM ISO 10312	ND (Sen: 0.0007 S/cm ³)	0.7938 s/cm ³ (1S) (Sen: 0.0007 S/cm ³)
Bulk	No Suspect Material Observed								
Dust	1/2000	4	0	0%	1	25%	TEM ISO 10312	ND (Sen: 32 – 26,769 S/cm ²)	1,836 s/cm ² (57S) (Sen: 32 – 26,769 S/cm ²)
Soil	3/2001 to 6/2001	52	10	19%	0	0%	All by 9002 then NDs by PLM-VE	43 ND by PLM-VE 6 <1% by 9002 3 >1% by 9002 1 TR by PLM-VE	ND

Head Start (formerly Plummer Elementary) – 2008 Investigation Results

Indoor Results	<ul style="list-style-type: none"> • Unexpanded vermiculite at moderate levels was observed in two, five-gallon buckets of sand in a storage room of the main gym area. One of the buckets had three toy shovels in it and a small quantity of sand was spilled on the floor nearby. • Vermiculite was also observed in the soil of a potted plant in the northwest office.
Outdoor Results	<ul style="list-style-type: none"> • No observations of vermiculite or insulation leaking from exterior walls

Notes: LA – Libby Amphibole; C – Chrysotile; TEM – transmission electron microscopy; ISO – International Organization of Standardization; ND – Non-detect; s/cm³ – structures per cubic centimeter; s/cm² – structures per square centimeter; S – structure count; 9002 – PLM Method NIOSH 9002; PLM-VE – polarized light microscopy by visual estimation; TR – trace (<0.2%); > - greater than; < - less than; % - percent; Sen - analytical sensitivity; **Indicates removal action taken based on result or observation.**

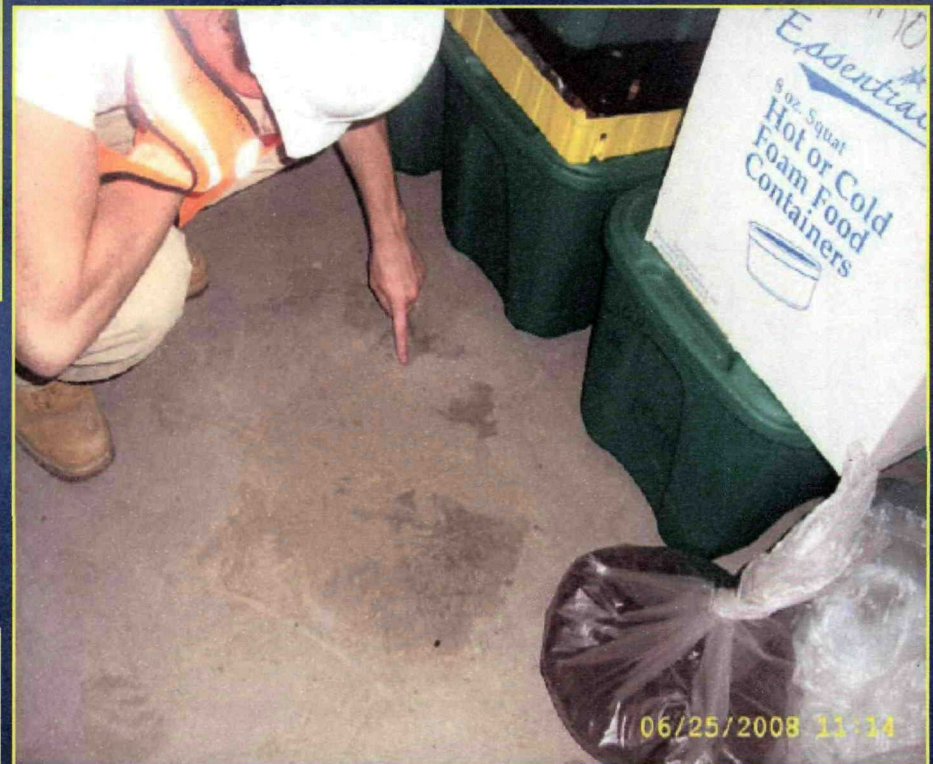


Head Start (Formerly Plummer Elementary): 2008 Observations



Five gallon buckets with moderate amounts of vermiculite observed and toy shovels.

Sand spilled with moderate levels of vermiculite.



Head Start (formerly Plummer Elementary) – Resulting Actions

Media	Detection Frequency	Resulting Action
Air	0/4	No Action Required
Bulk	2008: Sand with Moderate Vermiculite Observed	No Action Required ERS removal activity conducted to remove sand and vermiculite in 2008
Dust	0/4	No Action Required
Soil	10/52	July 2001: Removed soil from former ice rink area October 2002: Removed soil from former pond area



Head Start (Formerly Plummer Elementary): Removal Actions

*Removal performed to cleanup
vermiculite found at depth.*



*Removal performed to cleanup
vermiculite found at depth.*

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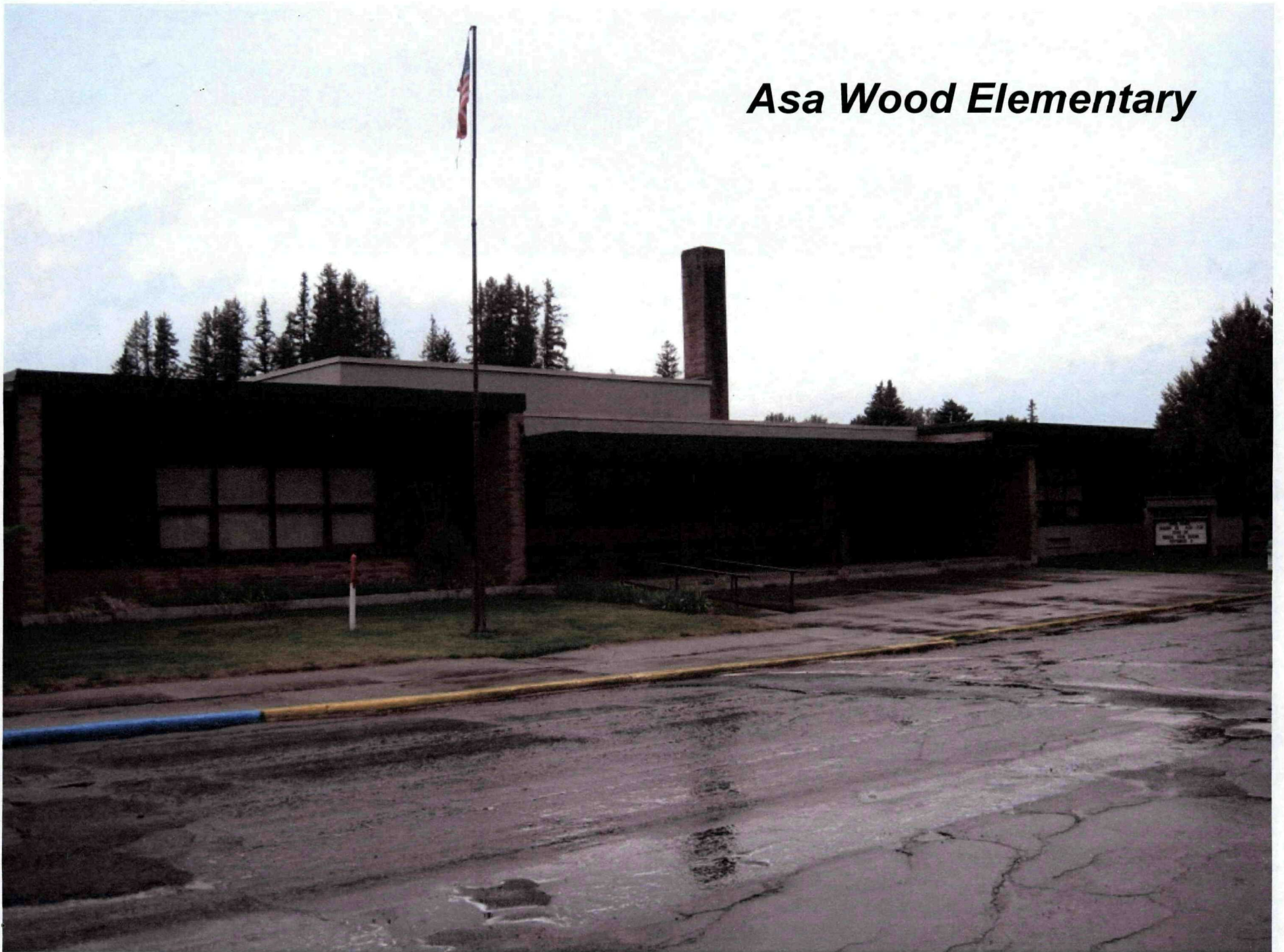
Head Start (Formerly Plummer Elementary): Removal Actions



Removal performed to cleanup vermiculite found along wall in parent's waiting room.

Vermiculite encountered during ERS cleanup activities and suspected to have come from the exterior wall.

Asa Wood Elementary



Asa Wood Elementary – Historical Investigation Results

Media	Date	# of Samples Collected	# and % of Samples with Detects				Analytical Method	Results Range	
			LA	%	C	%		LA	C
Air	1/2000	5	0	0%	0	0%	TEM ISO 10312	ND (Sen: 0.0007 – 0.0008 S/cm ³)	ND (Sen: 0.0007 – 0.0008 S/cm ³)
Bulk	1/2000	No Suspect Building Material Observed							
Dust	1/2000	6	0	0%	2	33%	TEM ISO 10312	ND (Sen: 32 – 26,979 S/cm ²)	3,221 s/cm ² (1S) to 43,167 s/cm ² (8S) (Sen: 32 – 26,979 S/cm ²)
Soil	3/2000	13	NA		NA		NA	Archived	
	6/2001	31	5	16%	0	0%	All by 9002 then NDs by PLM-VE	26 ND by PLM-VE 3 TR by PLM-VE 2 <1% by 9002	ND

Asa Wood Elementary – 2008 Investigation Results

Indoor Results	<ul style="list-style-type: none"> •VCBM observed in wall plaster in reading room and near stage. Found in good condition and non-friable. •VCI observed in cinder block wall as the result of puncture from forklift in 2/2008
Outdoor Results	<ul style="list-style-type: none"> •Walking path: samples collected (16 – ND, 2 – TR by PLM-VE) and VV inspections conducted (1 “low” in each of 5 samples) every 150 feet •New playground: One sample collected (ND) and VV inspections conducted (none observed) •2001 sample locations: VV inspections conducted from 5 areas where samples were <1% or TR (3 “lows” at one location)

Notes: LA – Libby Amphibole; C – Chrysotile; TEM – transmission electron microscopy; ISO – International Organization of Standardization; ND – Non-detect; s/cm² – structures per square centimeter; S – structure count; 9002 – PLM Method NIOSH 9002; PLM-VE – polarized light microscopy – visual estimation; TR – trace (<0.2%); < – less than; % – percent; VV – visual vermiculite; VCBM – vermiculite containing building material; VCI – vermiculite containing insulation; Sen – analytical sensitivity

Asa Wood Elementary – Resulting Actions

Media	Detection Frequency	Resulting Action
Air	0/5	No Action Required
Bulk	No Suspect Building Material Observed 2008: Forklift Punctured Cinder Block Wall Exposing VCI	No Action Required 2008: Spill Location Cleaned Up
Dust	0/6	No Action Required
Soil	5/31	No Action Required; Below Cleanup Criteria





Summary of Visual Vermiculite Observations at Asa Wood Elementary School in 2008

Location	Total Number of Pls	Relative Amount of Vermiculite Observed			
		None	Low	Medium	High
School Yard	540	535 99.07%	5 0.93%	0 0.00%	0 0.00%



New playground area at Asa Wood Elementary. Area sampled in 2008. Sample results were non-detect and vermiculite was not observed in the area.

Asa Wood Elementary: Removal Actions



Vermiculite insulation spilled from Asa Wood when wall was damaged by snow removal equipment

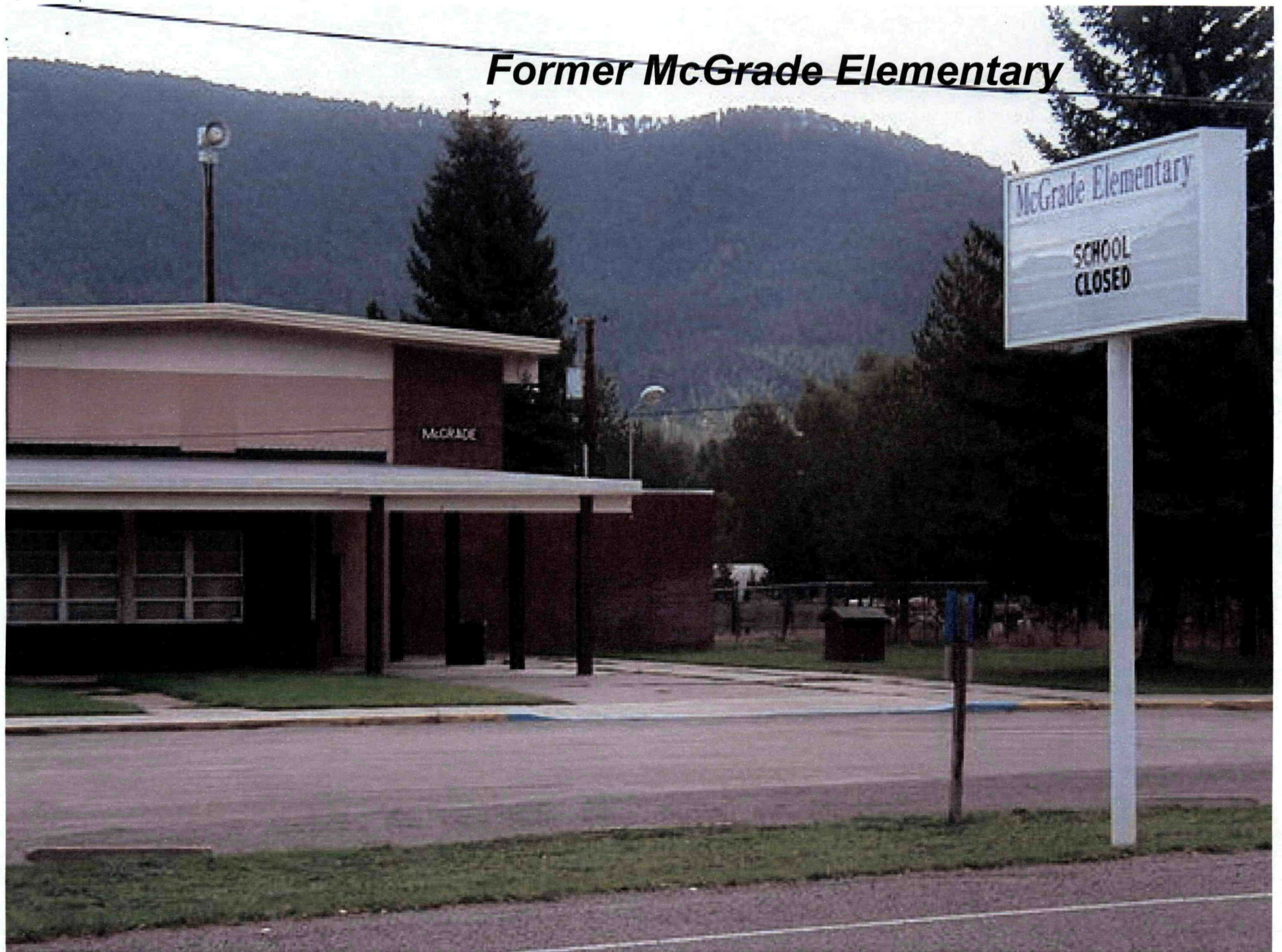
EPA Contractors conducted emergency removal action to repair hole and remove spilled vermiculite and vermiculite containing snow/soil



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Former McGrade Elementary



Former McGrade Elementary– Historical Investigation Results

Media	Date	# of Samples Collected	# and % of Samples with Detects				Analytical Method	Results Range	
			L A	%	C	%		LA	C
Air	1/2000	4	1	25%	0	0%	TEM ISO 10312	0.0007 S/cm ³ (1S) (Sen: 0.0007 S/cm ³)	ND (Sen: 0.0007 S/cm ³)
Bulk	No Suspect Building Material Observed								
Dust	1/2000	4	0	0%	4	100%	TEM ISO 10312	ND (Sen: 32 – 1,079 S/cm ²)	64 s/cm ² (2S) to 56,117 s/cm ² (52S) (Sen: 32 – 1,079 S/cm ²)
Soil	6/2001 to 8/2001	40	2	5%	0	0%	All by 9002 then NDs by PLM-VE	38 ND by PLM-VE 1 TR by PLM-VE 1 <1% by 9002	ND

Notes: LA – Libby Amphibole; C – Chrysotile; TEM – transmission electron microscopy; ISO – International Organization of Standardization; UNK – unknown; ND – Non-detect; s/cm² – structures per square centimeter; S – structure count; 9002 – PLM Method NIOSH 9002; PLM-VE – polarized light microscopy – visual estimation; TR – trace (<0.2%); < - less than; % - percent; Sen – analytical sensitivity; **Indicates removal action taken based on result or observation.**

Former McGrade Elementary – Resulting Actions

Media	Detection Frequency	Resulting Action
Air	1/4 (Reporting Issue with Sample – Concentration Unknown)	No Action Required
Bulk	No Suspect Building Material Observed	No Action Required
Dust	0/4	No Action Required
Soil	2/40	No Action Required; Below Cleanup Criteria





Libby Middle School



Libby Middle School – Historical Investigation Results

Media	Date	# of Samples Collected	# and % of Samples with Detects				Analytical Method	Results Range	
			LA	%	C	%		LA	C
Air	1/2000	8	0	0%	0	0%	TEM ISO 10312	ND (S: 0.0007 S/cm ³)	ND (S: 0.0007 S/cm ³)
Bulk	1/2000	No Suspect Building Material Observed							
Dust	1/2000	7	0	0%	4	57%	TEM ISO 10312	ND (S: 32 – 53,958 S/cm ²)	32 s/cm ² (1S) to 52,879 s/cm ² (49S) (S: 32 – 53,958 S/cm ²)
Soil	3/2001 to 6/2001	175	43	25%	0	0%	All by 9002 then NDs by PLM-VE	109 ND by PLM-VE 21 TR by 9002 9 TR by 9002 13 >1% by PLM-VE	ND

Libby Middle School – 2008 Investigation Results

Indoor Results	<ul style="list-style-type: none"> •Unexpanded vermiculite observed in Room 501 beneath sink, disposed of as IDW •Unexpanded vermiculite observed in Room 505 in potted plants
Outdoor Results	<ul style="list-style-type: none"> •Water faucet excavations: excavation inspection - no VV observed •Sprinkler system repair: excavation inspection – one flake of vermiculite observed •Playground area: samples collected (4 – ND) and VV inspections (1 “low” in each of 2 samples; 2 “lows” in one sample; 3 “lows” in one sample).

Notes: LA – Libby Amphibole; C – Chrysotile; TEM – transmission electron microscopy; ISO – International Organization of Standardization; ND – Non-detect; s/cm² – structures per square centimeter; S – structure count; 9002 – PLM Method NIOSH 9002; PLM-VE – polarized light microscopy – visual estimation; TR – trace (<0.2%); > - greater than; % - percent; VV – visual vermiculite; IDW – investigation derived waste; **Red Font – See Removal Actions**

Summary of Visual Vermiculite Observations at Libby Middle School in 2008

Location	Total Number of Pls	Relative Amount of Vermiculite Observed			
		None	Low	Medium	High
School Yard	120	113 94.17%	7 5.83%	0 0.00%	0 0.00%

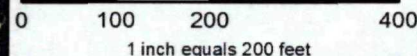
Legend

- surface soil sample - ND for LA
- surface soil sample - TR LA
- surface soil sample - < 1% LA
- surface soil sample - >= 1% LA
- SI-00023 Visible Vermiculite Reported

The OU boundaries depicted are based on the definitions found in the Libby Asbestos Conceptual Site Model, Revision 19. Because investigation of the nature and extent of contamination continues, the OU boundaries are subject to change. These OU boundaries are current as of September 2008.



Scale of Feet



Libby Middle School Investigation Sample Results

Libby Asbestos Project
Libby, Montana

CDM

Libby Middle School – Resulting Actions

Media	Detection Frequency	Resulting Action
Air	0/8	No Action Required
Bulk	No Suspect Building Material Observed	No Action Required
Dust	0/7	No Action Required
Soil	43/175	August 2001: Large scale soil removal from school grounds and track area August 2004: Isolated soil removal from southeast corner of school grounds

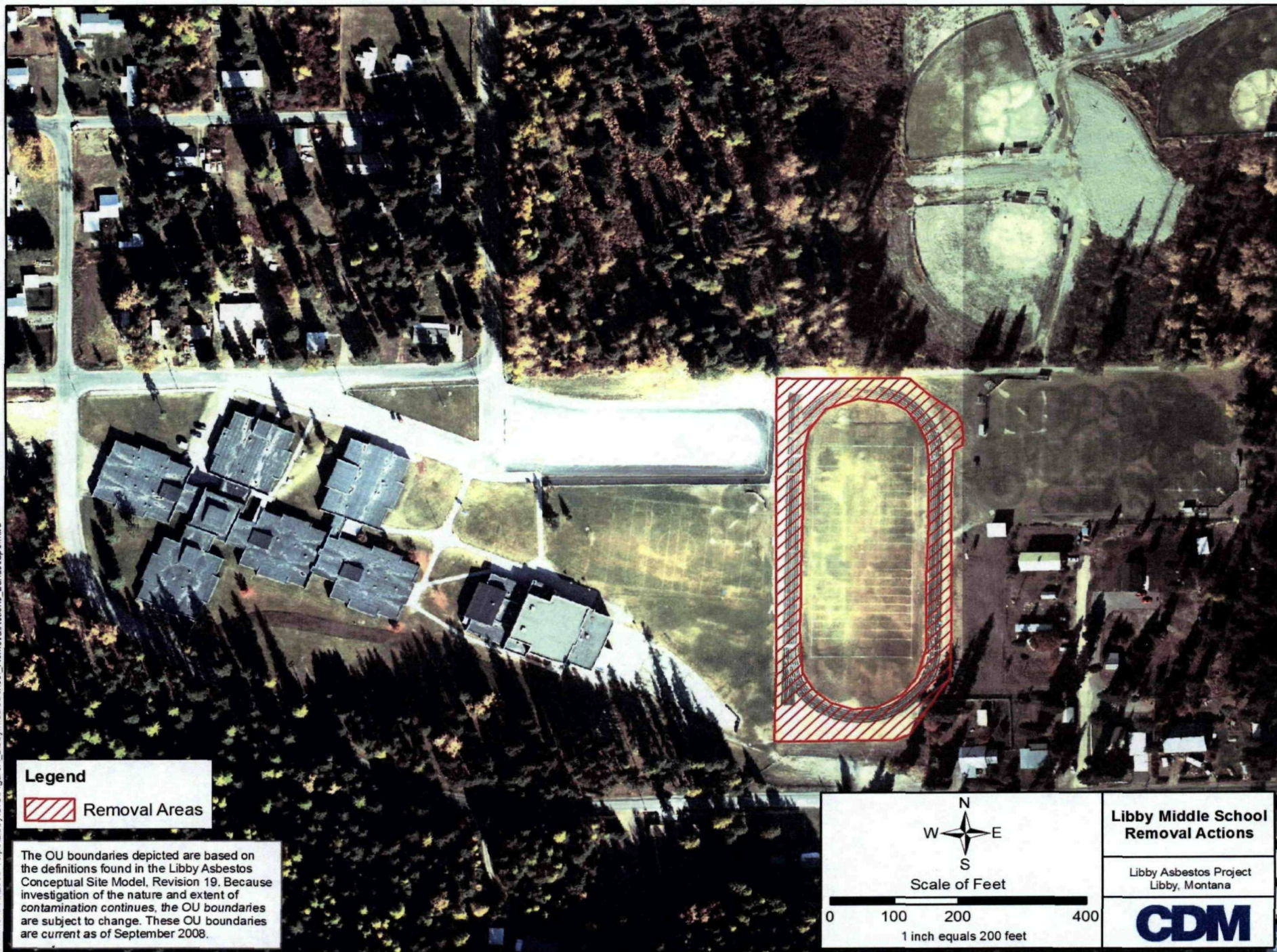


Libby Middle School: Removal Actions


*Removal action conducted at the
Libby Middle School track.*



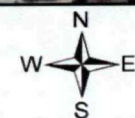
*Removal action conducted at the
Libby Middle School track.*



Legend

 Removal Areas

The OU boundaries depicted are based on the definitions found in the Libby Asbestos Conceptual Site Model, Revision 19. Because investigation of the nature and extent of contamination continues, the OU boundaries are subject to change. These OU boundaries are current as of September 2008.



Scale of Feet

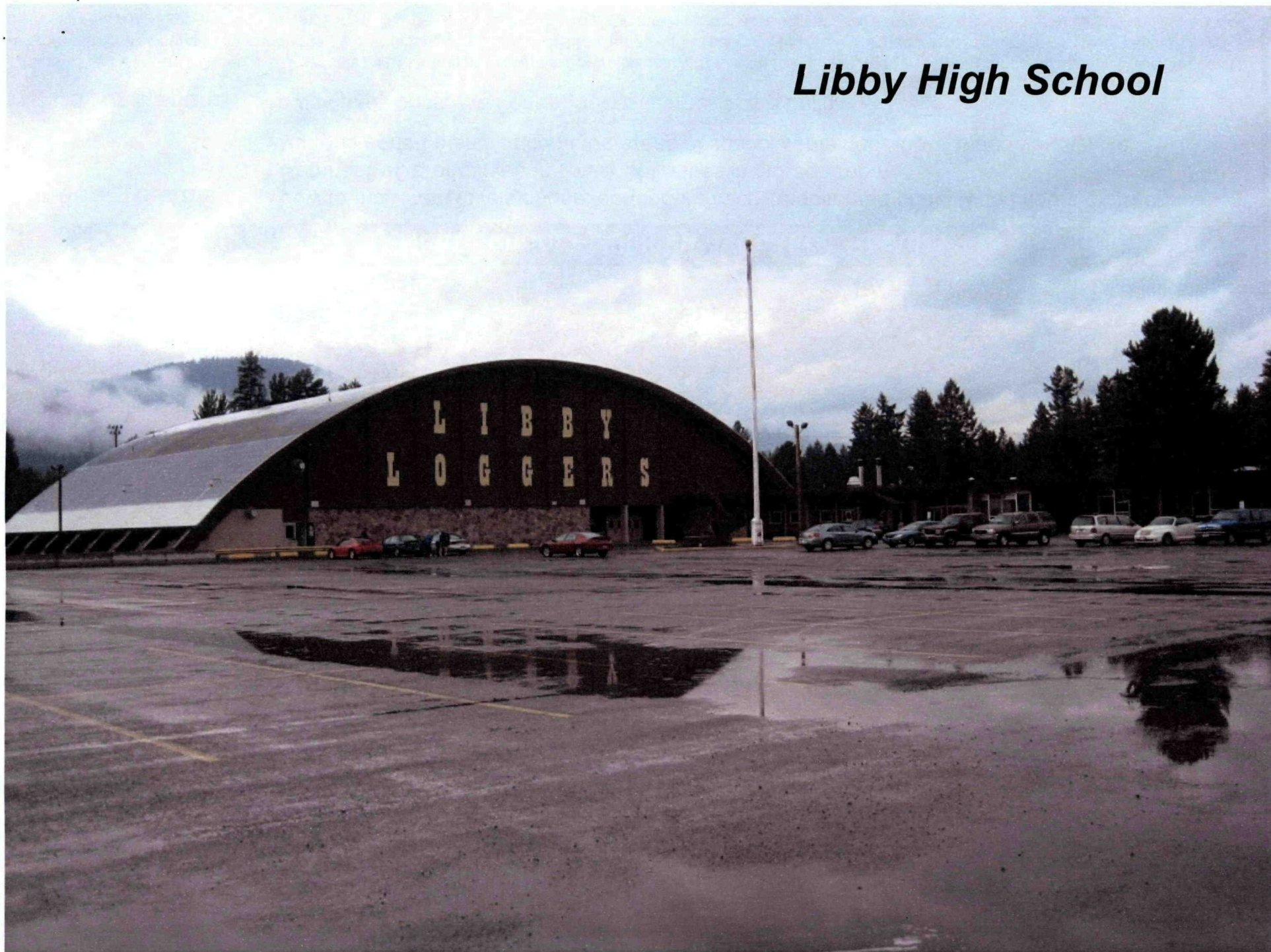
0 100 200 400
1 inch equals 200 feet

**Libby Middle School
Removal Actions**

Libby Asbestos Project
Libby, Montana

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Libby High School



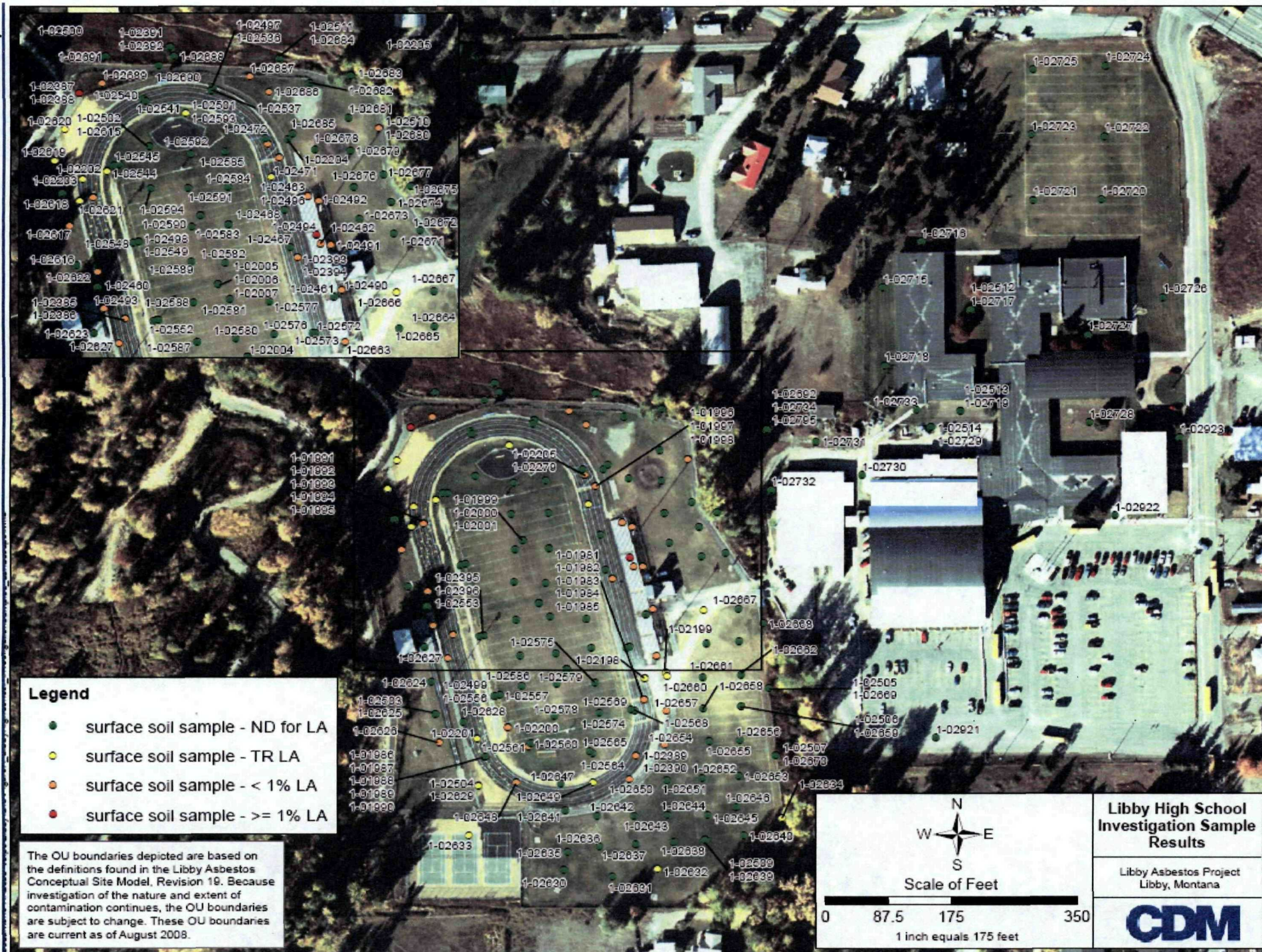
Libby High School – Historical Investigation Results

Media	Date	# of Samples Collected	# and % of Samples with Detects				Analytical Method	Results Range	
			LA	%	C	%		LA	C
Air	1/2000	11	0	0%	0	0%	TEM ISO 10312	ND (Sen: 0.0007 – 0.0008 S/cm ³)	ND (Sen: 0.0007 – 0.0008 S/cm ³)
Bulk	10/2001	4	0	0%	0	0%	9002	ND	ND
Dust	1/2000	10	1	10%	3	30%	TEM ISO 10312	322 s/cm ² (1/S) (Sen: 32 – 26,979 S/cm ²)	322 s/cm ² (1S) to 16,188 s/cm ² (3S) (Sen: 32 – 26,979 S/cm ²)
	6/2001	2	1	50%	1	50%	TEM ISO 10312	42,459 s/cm ² (3S) (Sen: 2,831 – 14,153 S/cm ²)	113,224 s/cm ² (8S) (Sen: 2,831 – 14,153 S/cm ²)
	8/2001	4	4	100%	4	100%	TEM ISO 10312	1,132 s/cm ² (1S) to 8,492 s/cm ² (3S) (Sen: 566 – 2,831 S/cm ²)	1,698 s/cm ² (3S) to 62,273 s/cm ² (22S) (Sen: 566 – 2,831 S/cm ²)
	9/2001	2	1	50%	0	0%	TEM ISO 10312	2,831 s/cm ² (1S) (Sen: 2,831 S/cm ²)	ND (Sen: 2,831 S/cm ²)
Soil	3/2001 to 7/2001	218	78	36%	3	1%	All by 9002 then NDs by PLM-VE	51 <1% by 9002 8 >1% by 9002 18 TR by PLM-VE 1 <1% by PLM-VE	3 <1% by 9002

Libby High School – 2008 Investigation Results

Indoor Results	<ul style="list-style-type: none"> • Low to moderate levels of unexpanded vermiculite observed under wood floors of greenhouses • Remnant VCS observed in flower pot bases in storage room • Various potted plants in common areas of school contained unexpanded vermiculite
Outdoor Results	<ul style="list-style-type: none"> • Two flakes observed near northeast corner of the building

Notes: LA – Libby Amphibole; C – Chrysotile; TEM – transmission electron microscopy; ISO – International Organization of Standardization; ND – Non-detect; s/cm² – structures per square centimeter; S – structure count; 9002 – PLM Method NIOSH 9002; PLM-VE – polarized light microscopy – visual estimation; TR – trace (<0.2%); > - greater than; < - less than; % - percent; VCS – vermiculite containing soil; Sen – analytical sensitivity; **Indicates removal action taken based**



Legend

- surface soil sample - ND for LA
- surface soil sample - TR LA
- surface soil sample - < 1% LA
- surface soil sample - >= 1% LA

The OU boundaries depicted are based on the definitions found in the Libby Asbestos Conceptual Site Model, Revision 19. Because investigation of the nature and extent of contamination continues, the OU boundaries are subject to change. These OU boundaries are current as of August 2008.



Scale of Feet

0 87.5 175 350
1 inch equals 175 feet

Libby High School Investigation Sample Results

Libby Asbestos Project
Libby, Montana

CDM

Libby High School: 2008 Observations



Potted plant stored in common area with moderate amounts of vermiculite observed.

Vermiculite observed beneath floorboards of greenhouse.



Libby High School – Resulting Actions

Media	Detection Frequency	Resulting Action
Air	0/11	No Action Required
Bulk	0/4	No Action Required
Dust	7/18	<p>June 2001: Football field storage building cleaned and new equipment purchased</p> <p>August 2001: Snack bar, press box, visitor's coach box, and storage garage cleaned</p> <p>September 2001: Visitor's side bleachers cleaned</p>
Soil	78/218	June 2001: Large scale soil removal from track area and from a portion of the tennis courts



Libby High School: Removal Actions



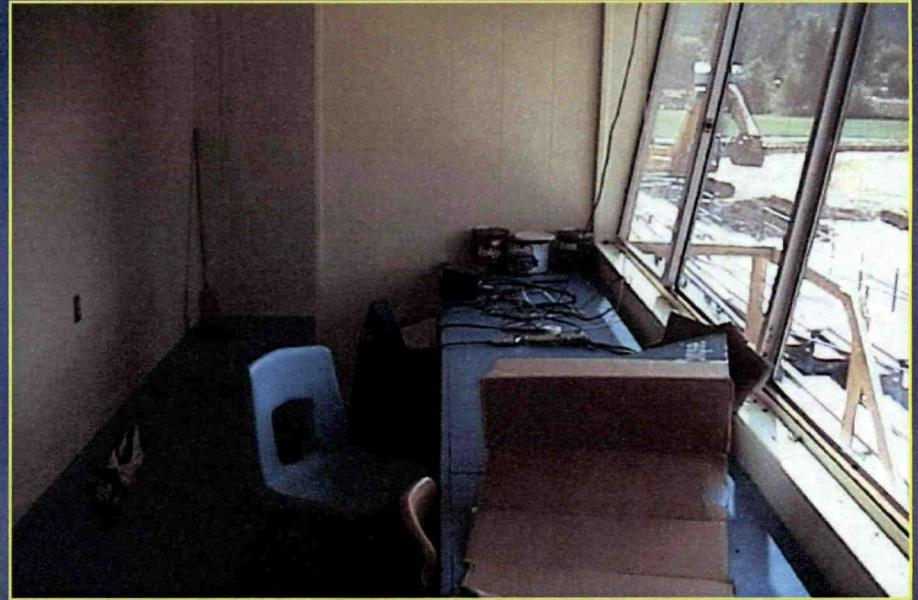
Removal of long jump pit and runway.

*Removal of portion of tennis court.
Vermiculite and mine tailings were
“chased” and found to be sub-base for the
tennis courts.*



Libby High School: Removal Actions

Press box that required interior cleaning due to LA observed in dust samples.



Equipment storage area that required interior cleaning due to LA observed in dust samples.

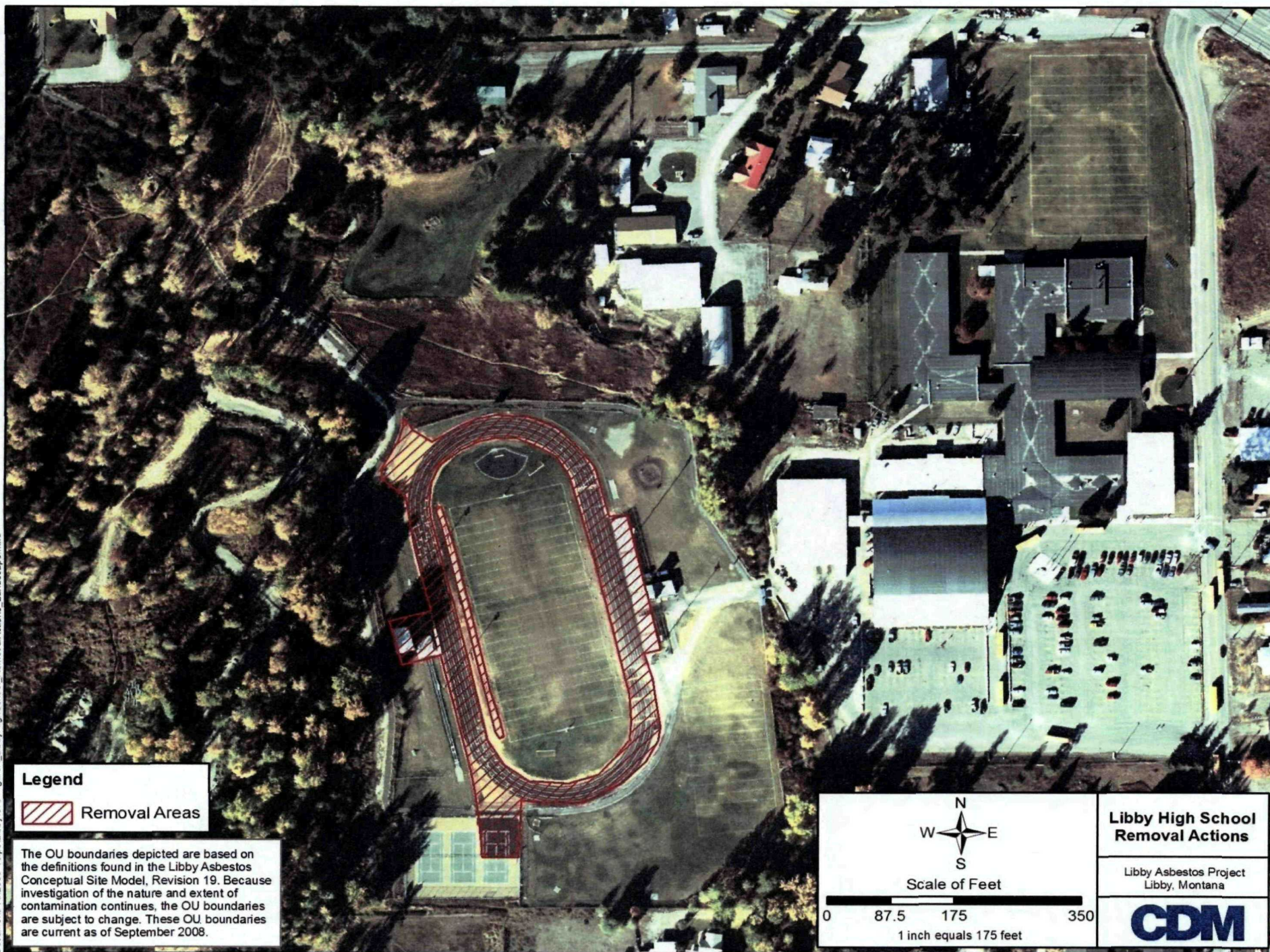
Libby High School: Removal Actions




Cleaning of bleachers resulting from LA observed in dust samples.



Soil removal completed under bleachers.



Legend

 Removal Areas

The OU boundaries depicted are based on the definitions found in the Libby Asbestos Conceptual Site Model, Revision 19. Because investigation of the nature and extent of contamination continues, the OU boundaries are subject to change. These OU boundaries are current as of September 2008.



Scale of Feet

0 87.5 175 350
1 inch equals 175 feet

Libby High School Removal Actions

Libby Asbestos Project
Libby, Montana

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Libby Administration Building



Libby Administration Building – Historical Investigation Results

Media	Date	# of Samples Collected	# and % of Samples with Detects				Analytical Method	Results Range	
			LA	%	C	%		LA	C
Air	1/2000	5	1	20%	2	40%	TEM ISO 10312	0.0008 s/cm ³ (1S) (Sen: 0.0005 – 0.0007 S/cm ³)	1.1274 s/cm ³ (2S) to 1.6211 s/cm ³ (2S) (Sen: 0.0005 – 0.0007 S/cm ³)
Bulk	6/2001	7	2	29%	0	0%	9002	<1%	ND
Dust	1/2000	5	0	0%	4	80%	TEM ISO 10312	ND (Sen: 32 S/cm ²)	258 s/cm ² (8S) to 644 s/cm ² (20S) (Sen: 32 S/cm ²)
	6/2001	2	0	0%	0	0%	TEM ISO 10312	ND (Sen: 566 S/cm ²)	ND (Sen: 566 S/cm ²)
	4/2003	10	0	0%	0	0%	TEM ISO 10312	ND (Sen: 73 - 293 S/cm ²)	ND (Sen: 73 - 293 S/cm ²)
	6/2003	3	0	0%	0	0%	TEM ISO 10312	ND (Sen: 146 - 585 S/cm ²)	ND (Sen: 146 - 585 S/cm ²)
Soil	3/2001	6	0	0%	0	0%	All by 9002 then NDs by PLM-VE	ND	ND
	6/2001	7	0	0%	0	0%	All by 9002 then NDs by PLM-VE	ND	ND
	4/2003	7	0	0%	0	0%	PLM-VE	ND	ND

Libby Administration Building – 2008 Investigation Results

Indoor Results	<ul style="list-style-type: none"> •VCI was not observed •VCBM in the form of plaster was observed in the second floor storage room. The material was found in good condition and was not friable.
Outdoor Results	<ul style="list-style-type: none"> •VCI was not observed

Notes: LA – Libby Amphibole; C – Chrysotile; TEM – transmission electron microscopy; ISO – International Organization of Standardization; ND – Non-detect; s/cm² – structures per square centimeter; S – structure count; 9002 – PLM Method NIOSH 9002; PLM-VE – polarized light microscopy – visual estimation; < – less than; % – percent; VCBM – vermiculite containing building material; Sen – analytical sensitivity

Libby Administration Building – Resulting Actions

Media	Detection Frequency	Resulting Action
Air	1/5	No Action Required
Bulk	2/7	No Action Required VCI Reported in Attic; Cleaned
Dust	0/20	No Action Required
Soil	0/20	No Action Required





Legend

- surface soil sample - ND for LA
- surface soil sample - TR LA
- surface soil sample - < 1% LA
- surface soil sample - >= 1% LA

The OU boundaries depicted are based on the definitions found in the Libby Asbestos Conceptual Site Model, Revision 19. Because investigation of the nature and extent of contamination continues, the OU boundaries are subject to change. These OU boundaries are current as of August 2005.



Scale of Feet

0 50 100 200
1 inch equals 100 feet

Libby Administration
Building
Investigation Sample
Results

Libby Asbestos Project
Libby, Montana

CDM

Libby Administration Building: Removal Actions

*Attic before removal action was
completed.*



*Vermiculite observed in the
storage room.*

Proposed Future Sampling

Proposed Sampling				
Location	Sampling Strategy	Decision		
Indoor	Stationary Air (During School Hours)	Greater Than Risk Based Concentration = Action		
	Limited Personal Air (EPA Contractors over Weekends)			
Outdoor	Soil Sampling and Visual Vermiculite Observations	PLM	VIS	No Action Required
		-	-	
		+	-	ABS or Other Action
		-	+	
		+	+	